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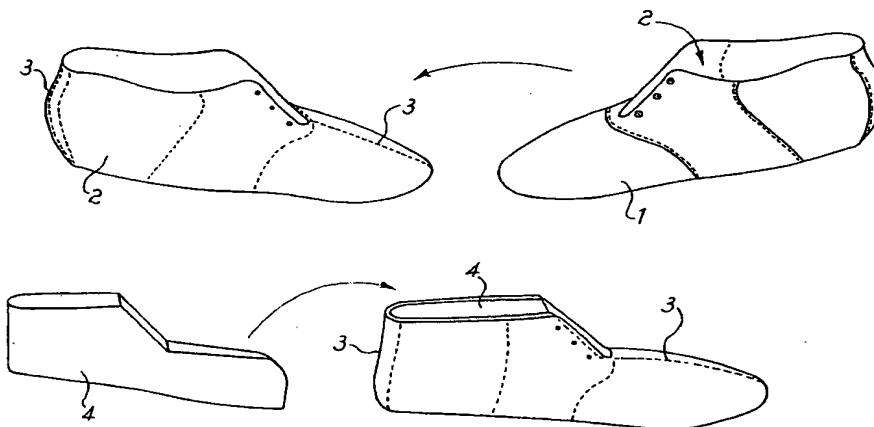
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(54) Title: **PROCESS AND DEVICE FOR WATERPROOFING SEMIMANUFACTURED SHOES, CLOTHING ITEMS AND ACCESSORIES, AND SEMIMANUFACTURED PRODUCTS OBTAINED WITH SAID PROCESS**



(57) Abstract: Process for waterproofing a semimanufactured product (1) of shoes, clothing items and accessories, said semimanufactured product (1) having a three-dimensional conformation, at least one inner surface (2) and one outer surface, characterized in that it comprises the following operative steps: turning inside out the semimanufactured product (1) so that its inner surface (2) is turned outwards; inserting at least one shaped member (4; 8) inside the semimanufactured product (1); pressing the semimanufactured product (1) provided with the shaped member (4; 8) between at least a pair of sheets (5) of a semi-permeable membrane whose surface turned toward the semimanufactured product (1) turned inside out is provided with a glue pattern; turning the semimanufactured product (1) so that its inner surface is turned inwards. The present invention also relates to a device for carrying out said process and the semimanufactured products obtained with said process.

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PROCESS AND DEVICE FOR WATERPROOFING SEMIMANUFACTURED SHOES, CLOTHING ITEMS AND ACCESSORIES, AND SEMIMANUFACTURED PRODUCTS OBTAINED WITH SAID PROCESS

5 The present invention relates to a process for waterproofing semimanufactured shoes, clothing items and accessories, in particular during their manufacture. The present invention also relates to a device for carrying out said process and the semimanufactured products obtained with said process.

 The PCT application WO 00/22948 in the name of the same applicant
10 discloses a process for waterproofing leather and semimanufactured products made up of leather pieces sewed together. This known process comprises a pressing on the inner leather surface of at least one semi-permeable membrane whose surface contacting the leather is provided with a glue pattern. With this arrangement a suitable transpiration of the leather is obtained also in the areas
15 where it is glued to the membrane.

 However, this known process cannot be applied to semimanufactured products made of leather or fabric, also joined with other materials, which cannot be completely stretched onto a table since they have already taken, during the manufacture, a three-dimensional conformation with at least one inner surface and
20 one outer surface. A typical example of said semimanufactured products are the shoe uppers considered in their final working step, before the application of an inner lining, if any. In this step it is not possible any more to stretch the shoe upper onto a table without overlapping portions of the shoe upper itself, with consequent permanent deterioration of the shoe upper, if pressed. Other
25 semimanufactured products of this kind can be shoe uppers of boots, gloves, hats and any kind of clothing items during their final manufacturing step.

 It is therefore an object of the present invention to provide a waterproofing process free from said disadvantages, i.e. a process which can be applied in a suitable manner also to semimanufactured products having a three-dimensional
30 conformation. Said object is achieved with a process and a device, the main features of which are described in claim 1 and 22, respectively, and other features

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are described in the remaining claims.

Thanks to the inside out turning and to the shaped member which is inserted before the pressing into the semimanufactured product, it is possible to waterproof the latter also if it is already provided with a three-dimensional conformation.

- 5 With this arrangement, the semi-permeable membranes, when pressed, can perfectly adhere to the surfaces of the semimanufactured product without any formation of pleats or wrinkles.

Furthermore, the semi-permeable membranes, if they extend beyond the semimanufactured product folded and flattened, can adhere to each other and form
10 at least two strips that seal the semimanufactured product during the pressing. With this arrangement, the semimanufactured product is perfectly waterproofed on its whole surface.

Another advantage of the process according to the present invention lies in the fact of being carried out in a simple and quick way without particularly
15 complex and expensive machines, so that it can be employed not only in the industrial production, but also in the handicraft production, in particular of shoes.

According to a particular aspect of the invention, the process can be carried out in a simple and effective way by a particular device comprising a pair of deformable pressing plates.

20 Further advantages and features of the process according to the present invention will become clear to those skilled in the art from the following detailed and non-limiting description of two embodiments thereof with reference to the attached drawings, wherein:

- figure 1 shows perspective views of a shoe upper in the preliminary steps of the
25 waterproofing process according to the first embodiment;
- figure 2 shows a lateral view of the shoe upper of figure 1 during the pressing;
- figure 3 shows a perspective view of the shoe upper of figure 1 after the pressing;
- figure 4 shows a partial detailed view of the shoe upper of figure 1 after the
30 pressing;
- figure 5 shows a perspective view of a shoe upper in the preliminary steps of

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the waterproofing process according to the second embodiment;

- figure 6 shows a lateral view of the shoe upper of figure 5 before the pressing;
- figure 7 shows a lateral view of the shoe upper of figure 5 during the pressing;
- and
- 5 - figure 8 shows a lateral view of the shoe upper of figure 5 after the pressing.

Referring to figure 1, it is seen that in the process according to the first embodiment of the invention a semimanufactured product made of leather or fabric having a three-dimensional conformation with at least one outer surface and one inner surface, for instance the shoe upper 1 of a shoe, is turned inside out so that its inner surface 2 is turned outwards. Afterwards, the shoe upper 1 turned inside out is folded and flattened along at least two lines 3, in particular corresponding to the intersection with a vertical symmetry plane, so as to obtain two opposing surfaces, which are substantially the same. This operation could already allow in itself to proceed with a lamination with flat presses, but the pressing caused by the pressure along the folding lines 3 could damage the shoe upper 1, especially if the latter is already provided with accessories, for instance metal loops or double appliqué, which create thickness irregularities and contact discontinuities between the surfaces of the shoe upper 1 on the inside. For this purpose, a shaped member 4 of a deformable material, in particular elastic and/or heat-resistant, such as silicone, soft rubber, neoprene or other foamy materials, is suitably inserted into the shoe upper 1. The shaped member 4 can also be provided with at least one bladder suitable for being inflated under pressure. The profile and the thickness of member 4 are suitably shaped so as to adhere to the inner surfaces of the shoe upper 1 and compensate their irregularities, if any.

Referring to figure 2, it is seen that the shoe upper 1 turned inside out and internally provided with the shaped member 4 is arranged like a sandwich between at least one pair of sheets 5 of a semi-permeable membrane whose surface turned toward the shoe upper 1 turned inside out is provided with a glue pattern. The glue pattern of the semi-permeable membranes 5 can be thermally activated by the plates 6 of a flat press. The shoe upper 1 turned inside out and the semi-permeable membranes 5 are in fact pressed by plates 6, which are heated for

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the time necessary for the fusion of the glue pattern and its penetration into the material of the shoe upper 1.

In the present embodiment the glue pattern is made up of a plurality of dots of polyurethane glue, having a diameter comprised between 0,1 mm and 0,8 mm and a density comprised between 50 dots/cm² and 200 dots/cm². In other
5 embodiments of the present invention the glue pattern may be made up of glue arranged according to dot matrixes or along mutually parallel and/or perpendicular lines. By heating the membranes 5 during the pressing, their perfect adhesion to the shoe upper 1 is obtained, without the risk of plugging the pores
10 thereof with the glue. Membranes 5 are suitably made up of a sheet of a semi-permeable material, for instance made of polyurethane, polytetrafluoroethylene, polyester or other polymers, the thickness of which is preferably comprised between 5 µm and 100 µm. Particularly, membranes 5 according to the present embodiment of the invention are made of polyurethane. Further, they are
15 preferably elastic, with a coefficient of elongation higher than 50%, particularly 100%, and they are not porous, since they carry out the water vapor passage by osmosis, and therefore, differently from the porous membranes, the water passage is prevented even when they are pulled or bent. Further information about membranes 5 is contained in the PCT application WO 00/22948 in the name of
20 the same applicant.

The surface of the semi-permeable membranes 5 which is not provided with the glue pattern is generally fastened to a support sheet (not shown in the figure) which avoids its possible accidental breakage or bending before the application. Said sheet can be made of paper and can be detachable after that membranes 5
25 have been adhered to the shoe upper 1. In other embodiments of the present invention, the support sheet can be made of different materials, for example fabric or a similar material, and be firmly fastened to membranes 5 if it is desired that the shoe upper 1 is internally lined at the end of the processing.

Referring to figures 3 and 4, it is seen that the semi-permeable membranes 5
30 can extend beyond the profile of the shoe upper 1 so as to mutually adhere and form one or more strips 7 which seal the shoe upper 1 along the folding lines 3. If

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necessary, this sealing can be increased by gluing tapes of a waterproof material astride the free edges of strips 7.

Once extracted from the press and cooled, the shoe upper 1 waterproofed with the membranes 5 can be separated from the shaped member 4 and turned for returning to the original conformation. The shaped member 4 can be further reused for the lamination of other shoe uppers having the same shape and the same size.

Referring now to figure 5, it is seen that in the process according to the second embodiment of the invention the shoe upper 1 is turned inside out so that its inner surface 2 is turned outwards, so as in the first embodiment. However, the shoe upper 1 is not folded and flattened along lines 3, but it is arranged around a shaped member 8, which is rigid or semi-rigid and is preferably provided with a support rod 9 fixed to a portion of the shaped member 8 which is not covered by the shoe upper 1. The shaped member 8 has substantially the same shape of the finished semimanufactured product, for instance the shape of a shoe.

As in the first embodiment, the shoe upper 1 turned inside out and internally provided with the shaped member 8 is arranged like a sandwich between at least one pair of sheets 5 of a semi-permeable membrane provided with at least one glue pattern. However, in this second embodiment the whole of the shoe upper 1 and of the semi-permeable membranes 5 is pressed by a particular device according to the present invention, which comprises a press provided with a pair of deformable plates 10.

With reference to figure 6, it is seen that plates 10 comprise a box-like structure 11, for instance parallelepiped-shaped, provided with a pressing surface made up of an elastic sheet 12. The box-like structure 11 contains a fluid 13, for instance oil, under pressure and preferably heated.

Referring to figure 7, it is seen that during the pressing, the elastic sheets 12 of plates 10 become deformed, so as to compress and heat membranes 5 onto the outer surface of the shoe upper 1, which is kept stretched by the shaped member 8 supported by rod 9.

In figure 8 the shoe upper 1 is shown fastened to membranes 5, which can

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form one or more sealing strips 7. The rest of the process follows the above described process of the first embodiment.

Changes and/or additions can be made by those skilled in the art to the hereinabove described and illustrated embodiments, while remaining within the scope of the invention itself. It is for instance obvious that, by suitably modifying the shape of the shaped member 4 or 8, it is possible to waterproof not only the shoe uppers, but also gloves, hats and any kind of clothing items, which may be made not only of leather, but also of fabric and/or of other materials.

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CLAIMS

1. Process for waterproofing a semimanufactured product (1) of shoes, clothing items and accessories, said semimanufactured product (1) having a three-dimensional conformation, at least one inner surface (2) and one outer surface, characterized in that it comprises the following operative steps:
 - turning inside out the semimanufactured product (1) so that its inner surface (2) is turned outwards;
 - inserting at least one shaped member (4; 8) inside the semimanufactured product (1);
 - pressing the semimanufactured product (1) provided with the shaped member (4; 8) between at least a pair of sheets (5) of a semi-permeable membrane whose surface turned toward the semimanufactured product (1) turned inside out is provided with a glue pattern;
 - turning the semimanufactured product (1) so that its inner surface is turned inwards.
2. Process according to the previous claim, characterized in that the shaped member (4) is made of an elastic material.
3. Process according to one of the previous claims, characterized in that before the pressing the semimanufactured product (1) is folded and flattened along at least two folding lines (3).
4. Process according to one of the previous claims, characterized in that the folding lines (3) correspond to the intersection of the semimanufactured product (1) with a symmetry plane thereof, so as to obtain two opposing surfaces, which are substantially the same.
5. Process according to one of the previous claims, characterized in that the shaped member (4) is provided with at least one bladder.
6. Process according to claim 1, characterized in that the shaped member (8) is rigid or semi-rigid.
7. Process according to claim 6, characterized in that the shaped member (8) is provided with a supporting rod (9) fixed to a portion of the shaped member

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(8) which is not covered by the semimanufactured product (1).

8. Process according to one of the previous claims, characterized in that the semi-permeable membranes (5) extend beyond the profile of the semimanufactured product (1) so that they can adhere to each other and form one
5 or two strips (7) that seal the semimanufactured product (1).

9. Process according to one of the previous claims, characterized in that the profile and the thickness of the shaped member (4; 8) are shaped so as to adhere to the surfaces of the semimanufactured product (1) which are on the inside during the pressing and to compensate their irregularities, if any.

10 10. Process according to one of the previous claims, characterized in that the shaped member (4; 8) is made of a heat-resistant material.

11. Process according to one of the previous claims, characterized in that the glue pattern of the semi-permeable membranes (5) is thermoadhesive, and that the pressing of said membranes (5) onto the semimanufactured product (1) is a
15 hot-pressing.

12. Process according to one of the previous claims, characterized in that at least one semi-permeable membrane (5) is not porous and carries out the water vapor passage by osmosis.

13. Process according to one of the previous claims, characterized in that
20 at least one semi-permeable membrane (5) is elastic with a grade of elongation higher than 50%.

14. Process according to one of the previous claims, characterized in that at least one semi-permeable membrane (5) is made of polyurethane.

15. Process according to one of the previous claims, characterized in that
25 at least one semi-permeable membrane (5) has a thickness comprised between 5 μm and 100 μm .

16. Process according to one of the previous claims, characterized in that at least one semi-permeable membrane (5) is combined with a support sheet.

17. Process according to the preceding claim, characterized in that the
30 support sheet is made of fabric or a similar material, and is firmly fastened to the membrane (5).

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18. Process according to one of the previous claims, characterized in that the glue pattern is made up of a multiplicity of dots having a diameter comprised between 0,1 mm and 0,8 mm.

19. Process according to one of the previous claims, characterized in that
5 the glue pattern is made up of a multiplicity of dots having a density comprised between 50 dots/cm² and 200 dots/cm².

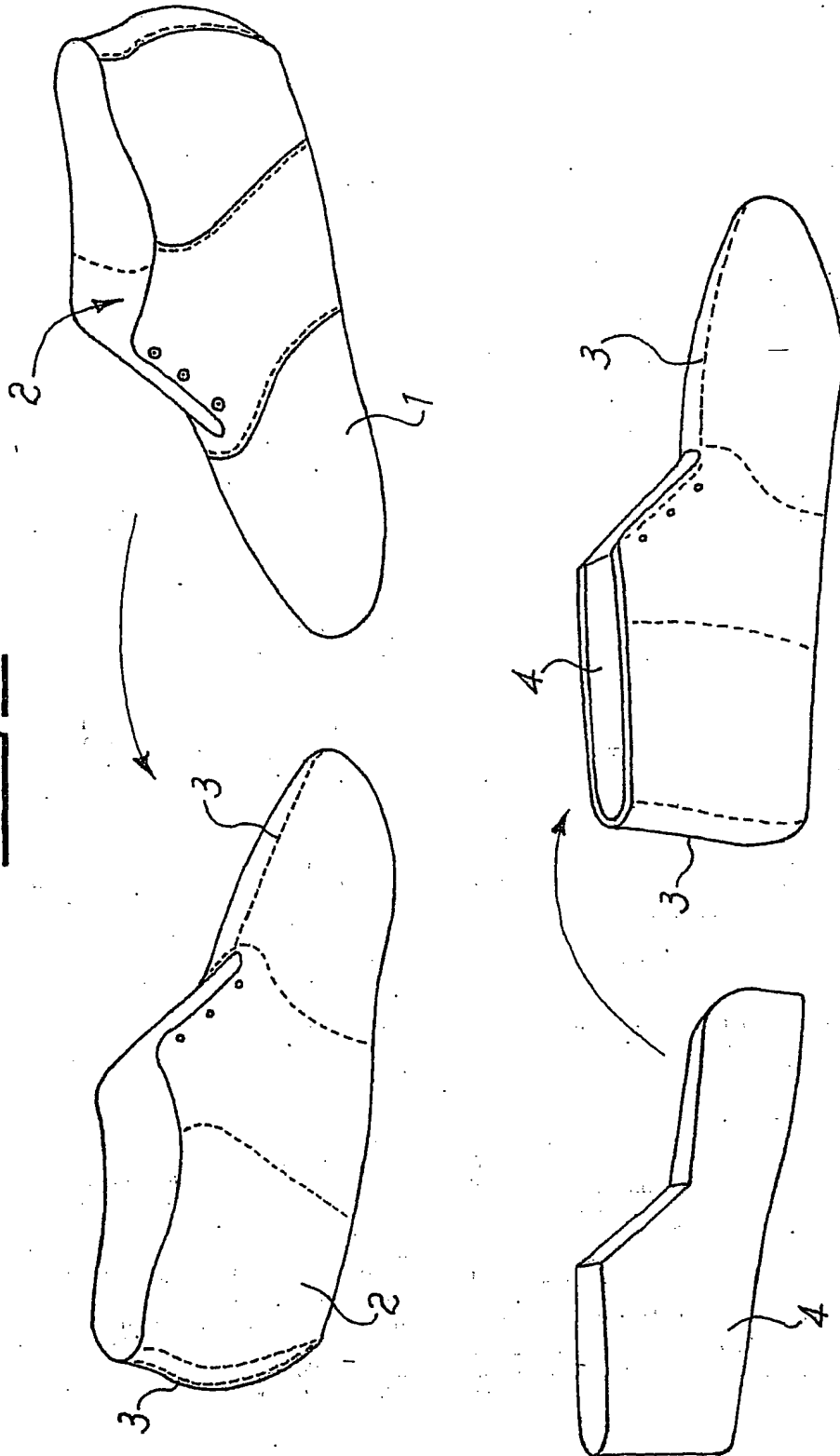
20. Semimanufactured product (1) of shoes, clothing items or accessories, characterized in that it is waterproofed by means of the process according to one of the previous claims.

10 21. Shoe upper (1), characterized in that it is waterproofed by means of the process according to one of claims 1 to 19.

22. Device for carrying out the process according to one of claims 1 to 19, characterized in that it comprises a press provided with deformable plates (10).

15 23. Device according to claim 22, characterized in that the deformable plates (10) comprise a box-like structure (11) which is provided with a pressing surface made up of an elastic sheet (12) and contains a fluid (13), heated and under pressure.

Fig. 1



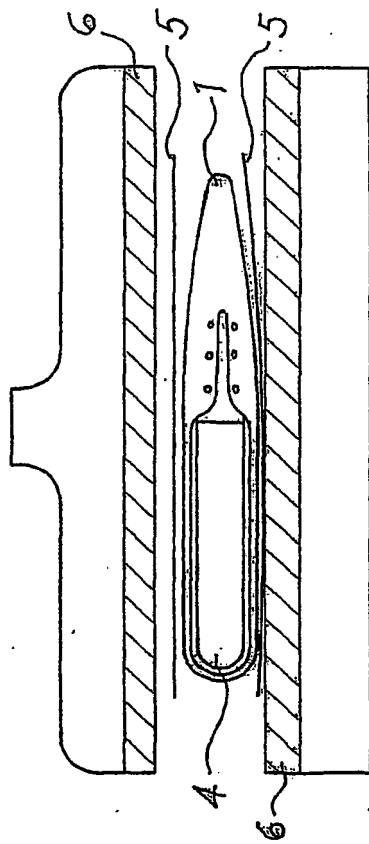


Fig. 2

Fig. 3

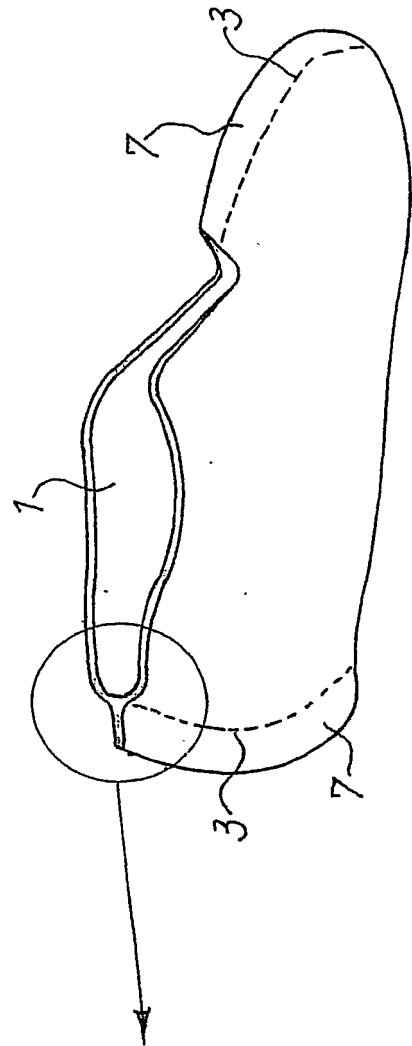


Fig. 4

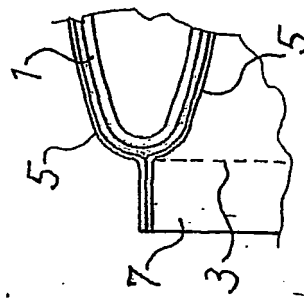


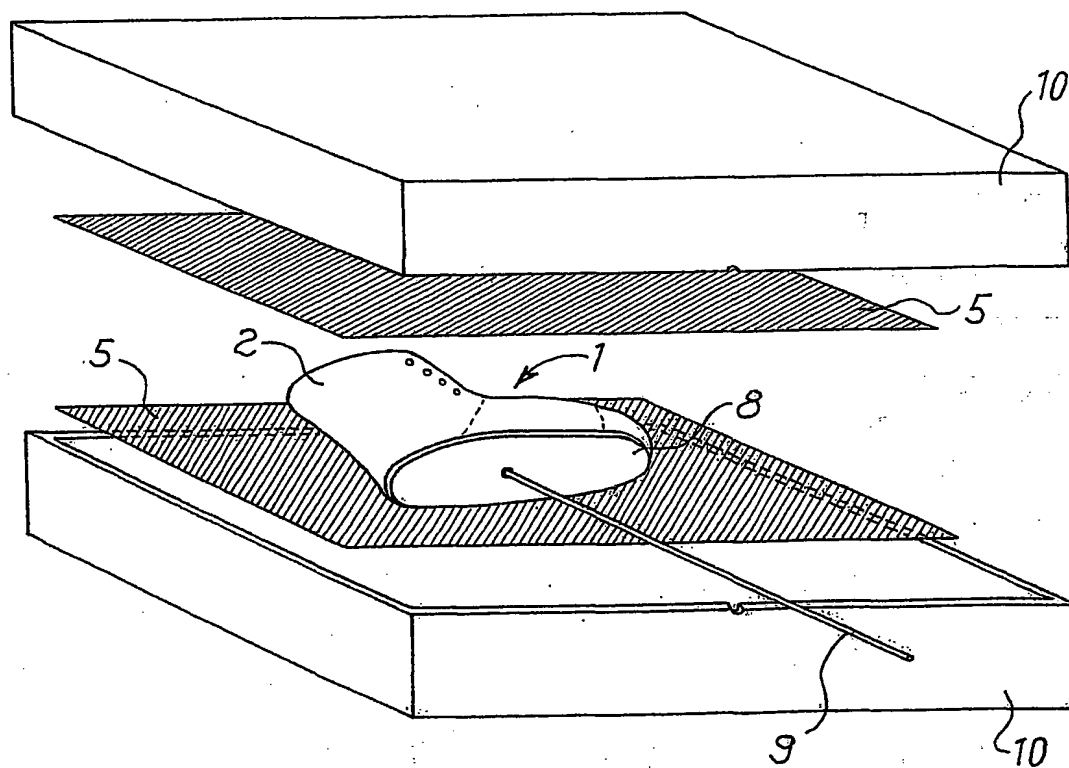
Fig. 5

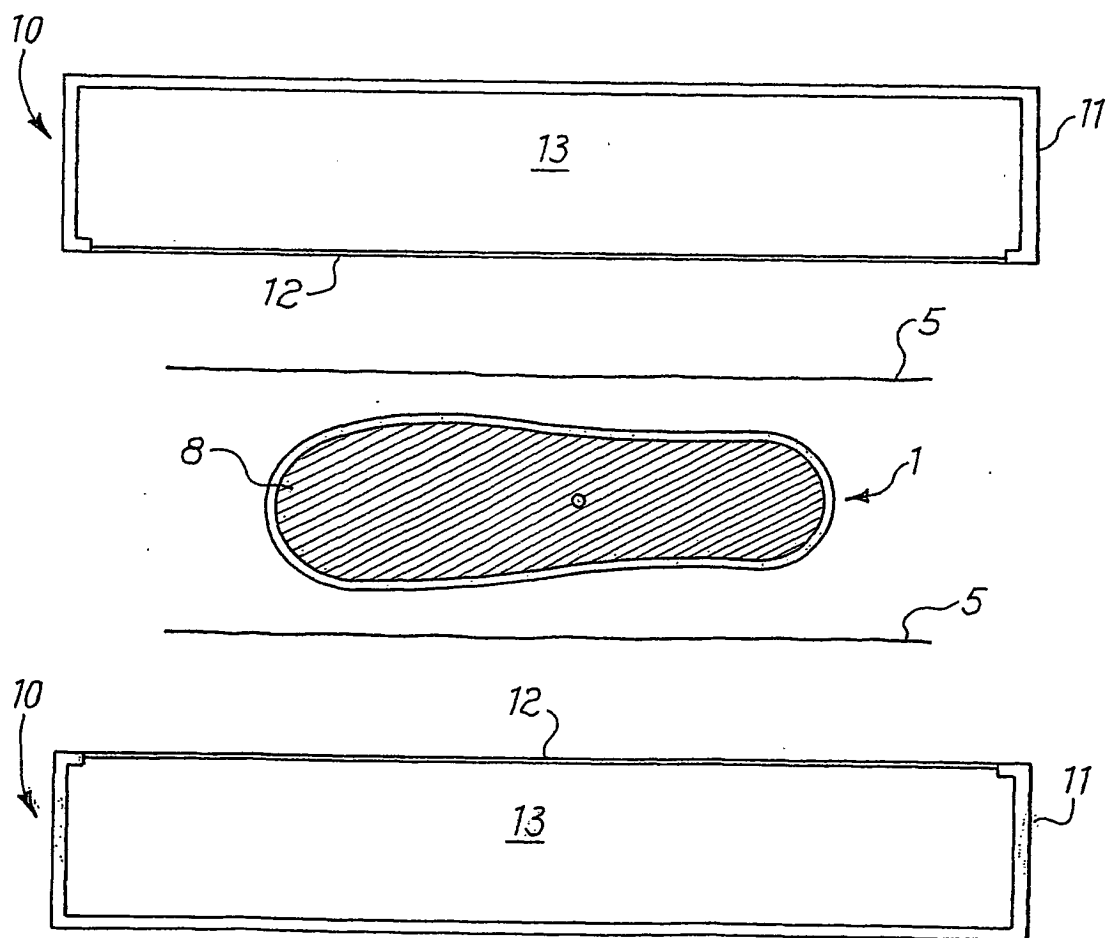
Fig. 6

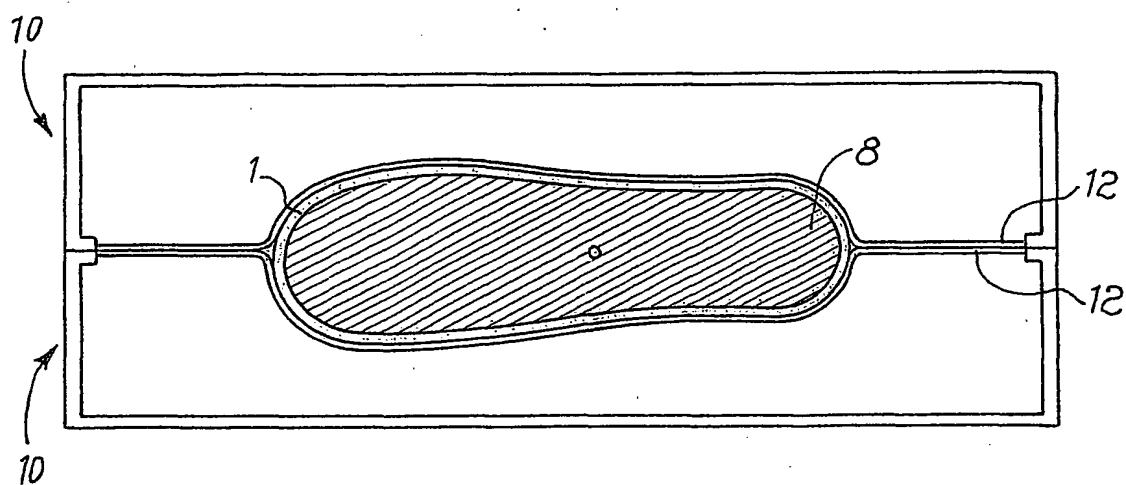
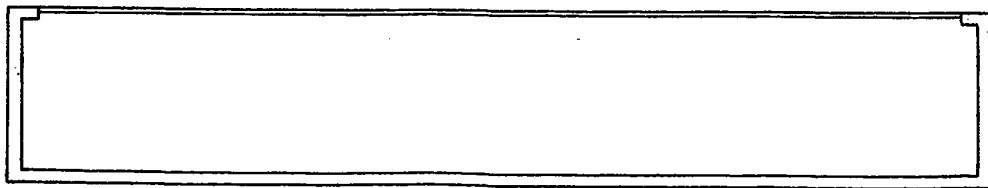
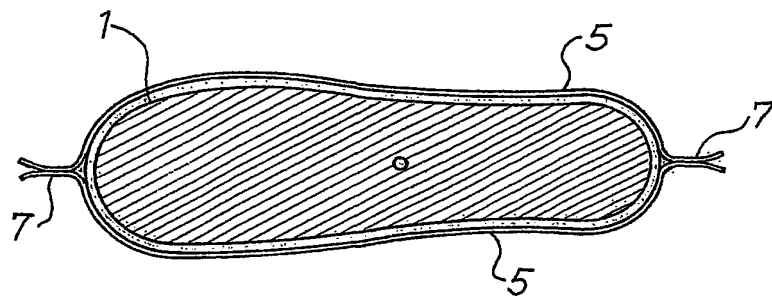
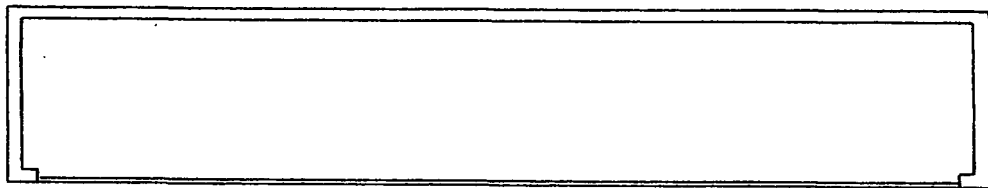
Fig. 7

Fig. 4



INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 01/00424

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A43B7/12 A43B9/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 380 902 A (CHEN CHIN LUNG) 8 August 1990 (1990-08-08) claims 1,5	1
A	EP 0 976 337 A (DECATHLON SA) 2 February 2000 (2000-02-02) the whole document	1,20-22



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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